

CLAIMS

1. A lithographic apparatus comprising:
 - an illumination system for providing a projection beam of radiation;
 - a support structure for supporting patterning structure, the patterning structure serving to impart the projection beam with a pattern in its cross-section;
 - a substrate table for holding a substrate;
 - a projection system for projecting the patterned beam onto a target portion of the substrate;
 - at least one optical element constructed and arranged to define an on-axis, substantially rectilinear intensity distribution on the projection beam; and
 - a polarizer, constructed and arranged to impart a linear polarization to the projection beam.
2. Apparatus according to claim 1 wherein said intensity distribution is a rectangle having an aspect ratio not equal to 1, and the longer dimension of the rectangle is parallel to the X or Y axis of the apparatus.
3. Apparatus according to claim 2 wherein said linear polarization is substantially parallel to the longer dimension of the rectangle.
4. Apparatus according to claim 1 wherein said intensity distribution is a square.
5. Apparatus according to claim 3 wherein said intensity distribution is oriented such that the sides of the square are parallel to X and Y axes.
6. Apparatus according to claim 3 wherein said intensity distribution is oriented such that the diagonals of the square are parallel to X and Y axes.
7. Apparatus according to claim 1 wherein said intensity distribution is cross-shaped.

8. Apparatus according to claim 3 wherein said intensity distribution is oriented such that the arms of the cross are aligned with X and Y axes of the apparatus.
9. Apparatus according to claim 1 wherein the center of said intensity distribution lies on the optical axis of the illumination system.
10. Apparatus according to claim 1 further comprising a phase-shift mask as said patterning structure.
11. Apparatus according to claim 1 wherein the rectilinear intensity distribution has at least two elongate poles located off-axis, and the direction of polarization is substantially parallel to the long direction of the poles.
12. Apparatus according to claim 10 wherein said rectilinear intensity distribution has four elongate poles, two of which are oriented along a first direction and two of which are oriented along a second direction substantially orthogonal to the first direction, the direction of polarization of the radiation in each pole being substantially parallel to the long direction of that pole.
13. Apparatus according to claim 10, wherein said at least one optical element comprises a diffractive optical element for generating a dipole or a quadrupole angular intensity distribution which is rotatable around an axis parallel to an optical axis of the radiation system and further comprises a rod-type optical integrator.
14. Apparatus according to claim 1 wherein said at least one optical element comprises a set of moveable blades.
15. Apparatus according to claim 1 wherein said at least one optical element comprises a diaphragm having an aperture or apertures corresponding to said intensity distribution.
16. Apparatus according to claim 14 wherein said polarize comprises polarizers mounted in the or each aperture of said diaphragm.

17. Apparatus according to claim 1 wherein said polarize comprises a radiation source that emits a linearly polarized beam.

18. A lithographic projection apparatus comprising:
an illumination system for providing a projection beam of radiation;
a support structure for supporting patterning structure, the patterning structure serving to impart the projection beam with a pattern in its cross-section;
a substrate table for holding a substrate;
a projection system for projecting the patterned beam onto a target portion of the substrate;
at least one optical element constructed and arranged to impart an intensity distribution that is not symmetric in an interchange of two orthogonal axes; and
a polarizer for imparting a linear polarization the projection beam.

19. A device manufacturing method comprising:
projecting a patterned beam of radiation onto a target portion of a substrate;
an intensity distribution of the patterned beam comprising an on-axis rectilinear intensity distribution; and
linearly polarizing said projection beam.

20. A method according to claim 18 wherein in said linearly polarizing, the direction of the linear polarization imparted to the beam is substantially parallel to lines of said pattern.